

I CLAIM:

1 1. A lost circulation additive comprising a dry mixture  
2 of a water soluble crosslinkable polymer, a crosslinking  
3 agent, and a reinforcing material selected from among  
4 fibers and comminuted plant materials.

1 2. The additive of claim 1 wherein the polymer is an a  
2 carboxylate-containing polymer and the crosslinking agent  
3 is a chromic carboxylate complex.

1 3. The additive of claim 2 wherein the reinforcing  
2 material comprises hydrophilic and hydrophobic fibers.

1 4. The additive of claim 3 wherein the hydrophobic  
2 fibers comprise at least one selected from the group of  
3 hydrophobic fibers consisting essentially of nylon,  
4 rayon, and hydrocarbon fibers, and wherein the  
5 hydrophilic fibers comprise at least one selected from  
the group of hydrophilic fibers consisting essentially of

7 glass, cellulose, carbon, silicon, graphite, calcined  
8 petroleum coke, and cotton fibers.

1 5. The additive of claim 2 wherein the reinforcing  
2 material comprises comminuted plant material.

1 6. The additive of claim 5 wherein the reinforcing  
2 material comprises at least one comminuted material  
3 selected from the group of comminuted plant materials  
4 consisting essentially of nut and seed shells or hulls of  
5 almond, brazil, cocoa bean, coconut, cotton, flax, grass,  
6 linseed, maize, millet, oat, peach, peanut, rice, rye,  
7 soybean, sunflower, walnut, and wheat; rice tips; rice  
8 straw; rice bran; crude pectate pulp; peat moss fibers;  
9 flax; cotton; cotton linters; wool; sugar cane; paper;  
10 bagasse; bamboo; corn stalks; sawdust; wood; bark; straw;  
11 cork; dehydrated vegetable matter; whole ground corn  
12 cobs; corn cob light density pith core; corn cob ground  
13 woody ring portion; corn cob chaff portion; cotton seed  
14 stems; flax stems; wheat stems; sunflower seed stems;

15 soybean stems; maize stems; rye grass stems; millet  
16 stems; and mixtures thereof.

1 7. The additive of claim 2 wherein the polymer is a  
2 partially hydrolyzed polyacrylamide.

1 8. The additive of claim 7 wherein the reinforcing  
2 material is a comminuted material selected from among  
3 comminuted materials derived from peanuts, wood, paper  
4 any portion of rice seed or plant, any portion of corn  
5 cobs, and mixtures thereof.

1 9. The additive of claim 8 wherein the additive further  
2 includes cellophane, and wherein the reinforcing material  
3 is a comminuted material selected from among mixtures of  
4 comminuted rice fraction and peanut hulls; mixtures of  
5 comminuted rice fraction, and wood fiber or almond hulls;  
6 mixtures of comminuted rice fraction and corn cob  
7 fraction; and mixtures of comminuted rice fraction and  
8 corn cob fraction and at least one of wood fiber, nut  
9 shells, and paper.

1 10. The additive of claim 9 wherein the reinforcing  
2 material comprises comminuted mixture of rice fraction,  
3 corn cob pith and chaff, cedar fiber, nut shells, and  
4 paper.

1 ~~11.~~ A method of forming a lost circulation fluid  
2 comprising:

3 (a) providing a lost circulation additive  
4 comprising a dry mixture of water soluble crosslinkable  
5 polymer, a crosslinking agent, and a reinforcing material  
6 selected from among fibers and comminuted plant  
7 materials; and

8 (b) contacting the lost circulation additive with  
9 water or an aqueous solution to form the lost circulation  
10 fluid.

1 12. The method of claim 11 wherein the polymer is a  
2 partially hydrolyzed polyacrylamide, the crosslinking  
3 agent is a chromic carboxylate complex, wherein the  
4 additive further includes cellophane, and wherein the

reinforcing material is a comminuted material selected from among mixtures of comminuted rice fraction and peanut hulls; mixtures of comminuted rice fraction, and wood fiber or almond hulls; mixtures of comminuted rice fraction and corn cob fraction; and mixtures of comminuted rice fraction and corn cob fraction and at least one of wood fiber, nut shells, and paper.

13. The additive of claim 12 wherein the reinforcing material comprises comminuted mixture of rice fraction, corn cob pith and chaff, cedar fiber, nut shells, and paper.

14. A method for preventing lost circulation from a borehole into a subterranean formation comprising:

(a) providing a lost circulation additive comprising a dry mixture of water soluble crosslinkable polymer, a crosslinking agent, and a reinforcing material selected from among fibers and comminuted plant materials;

(b) contacting the lost circulation additive with water or an aqueous solution to for a lost circulation fluid; and

(c) injecting the lost circulation fluid into the borehole.

15. The method of claim 14 wherein the polymer is an a carboxylate-containing polymer and the crosslinking agent is a chromic carboxylate complex

16. The method of claim 15 wherein the reinforcing material comprises hydrophilic and hydrophobic fibers.

17. The method of claim 16 wherein the hydrophobic fibers comprise at least one selected from the group of hydrophobic fibers consisting essentially of nylon, rayon, and hydrocarbon fibers, and wherein the hydrophilic fibers comprise at least one selected from the group of hydrophilic fibers consisting essentially of glass, cellulose, carbon, silicon, graphite, calcined petroleum coke, and cotton fibers.

1 18. The method of claim 15 wherein the reinforcing  
2 material comprises comminuted plant material.

1 19. The method of claim 18 wherein the reinforcing  
2 material comprises at least one comminuted material  
3 selected from the group of comminuted plant materials  
4 consisting essentially of nut and seed shells or hulls of  
5 almond, brazil, cocoa bean, coconut, cotton, flax, grass,  
6 linseed, maize, millet, oat, peach, peanut, rice, rye,  
7 soybean, sunflower, walnut, and wheat; rice tips; rice  
8 straw; rice bran; crude pectate pulp; peat moss fibers;  
9 flax; cotton; cotton linters; wool; sugar cane; paper;  
10 bagasse; bamboo; corn stalks; sawdust; wood; bark; straw;  
11 cork; dehydrated vegetable matter; whole ground corn  
12 cobs; corn cob light density pith core; corn cob ground  
13 woody ring portion; corn cob chaff portion; cotton seed  
14 stems; flax stems; wheat stems; sunflower seed stems;  
15 soybean stems; maize stems; rye grass stems; millet  
16 stems; and mixtures thereof.

1 20. The method of claim 15 wherein the polymer is a  
2 partially hydrolyzed polyacrylamide.

1 21. The method of claim 20 wherein the reinforcing  
2 material is a comminuted material selected from among  
3 comminuted materials derived from peanuts, wood, paper  
4 any portion of rice seed or plant, any portion of corn  
5 cobs, and mixtures thereof.

1 22. The method of claim 21 wherein the additive further  
2 includes cellophane, and wherein the reinforcing material  
3 is a comminuted material selected from among mixtures of  
4 comminuted rice fraction and peanut hulls; mixtures of  
5 comminuted rice fraction, and wood fiber or almond hulls;  
6 mixtures of comminuted rice fraction and corn cob  
7 fraction; and mixtures of comminuted rice fraction and  
8 corn cob fraction and at least one of wood fiber, nut  
9 shells, and paper.

1 23. The method of claim 22 wherein the reinforcing  
2 material comprises comminuted mixture of rice fraction,



3 corn cob pith and chaff, cedar fiber, nut shells, and  
4 paper.

5 24. A method for decreasing fluid loss from a borehole  
6 into a subterranean formation comprising:

7 (a) providing a lost circulation additive  
8 comprising an aqueous solution of water soluble  
9 crosslinkable polymer, a crosslinking agent, and a  
10 reinforcing material selected from among fibers and  
11 comminuted plant materials; and

12 (b) injecting the lost circulation fluid into the  
13 borehole.

1 25. The method of claim 24 wherein the polymer is an a  
2 carboxylate-containing polymer and the crosslinking agent  
3 is a chromic carboxylate complex.

1 26. The method of claim 25 wherein the reinforcing  
2 material comprises hydrophilic and hydrophobic fibers.

27. The method of claim 26 wherein the hydrophobic fibers comprise at least one selected from the group of hydrophobic fibers consisting essentially of nylon, rayon, and hydrocarbon fibers, and wherein the hydrophilic fibers comprise at least one selected from the group of hydrophilic fibers consisting essentially of glass, cellulose, carbon, silicon, graphite, calcined petroleum coke, and cotton fibers.

28. The method of claim 25 wherein the reinforcing material comprises comminuted plant material.

29. The method of claim 28 wherein the reinforcing material comprises at least one comminuted material selected from the group of comminuted plant materials consisting essentially of nut and seed shells or hulls of almond, brazil, cocoa bean, coconut, cotton, flax, grass, linseed, maize, millet, oat, peach, peanut, rice, rye, soybean, sunflower, walnut, and wheat; rice tips; rice straw; rice bran; crude pectate pulp; peat moss fibers; flax; cotton; cotton linters; wool; sugar cane; paper;

10 bagasse; bamboo; corn stalks; sawdust; wood; bark; straw;  
11 cork; dehydrated vegetable matter; whole ground corn  
12 cobs; corn cob light density pith core; corn cob ground  
13 woody ring portion; corn cob chaff portion; cotton seed  
14 stems; flax stems; wheat stems; sunflower seed stems;  
15 soybean stems; maize stems; rye grass stems; millet  
16 stems; and mixtures thereof.

1 30. The method of claim 25 wherein the polymer is a  
2 partially hydrolyzed polyacrylamide.

1 31. The method of claim 30 wherein the reinforcing  
2 material is a comminuted material selected from among  
3 comminuted materials derived from peanuts, wood, paper  
4 any portion of rice seed or plant, any portion of corn  
5 cobs, and mixtures thereof.

1 32. The method of claim 31 wherein the additive further  
2 includes cellophane, and wherein the reinforcing material  
3 is a comminuted material selected from among mixtures of  
4 comminuted rice fraction and peanut hulls; mixtures of

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